DOCUMENT RESUME

ED 242 641 SO 015 563

AUTHOR Cleveland, Harlan
TITLE The International Information Revolution.
PUB DATE 84
NOTE 26p.; Paper presented at the Seminar on State, Nation and Religion (Haifa, Israel, March 15, 1984).
PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Developed Nations; Developing Nations; Economic Development; Economic Factors; Educational Trends; *Futures (of Society); *Global Approach; Higher Education; *Information Dissemination; Information Science; Intellectual Property; Military Science; Political Influences; Resources; Revolution; Social Change; *Technological Advancement; World Affairs

ABSTRACT

Certain characteristics of information make it a crucial resource in today's world. Unlike material resources such as coal and steel, information is expandable, easily transportable, diffusive, and shareable. Because of these properties of information, the new "information age" has already begun to challenge some of mankind's most comfortable assumptions: the concepts of ownership, management, military strategy, and State. In the information age, the concept of ownership and control has changed, as evidenced by the U.S. Supreme Court decision that film companies are not protected from individual videocassette recorder owners taping television shows. Military policy, based on keeping secret the information about strategies and arms, is equally vulnerable in the information age. New technology will ultimately change the concept of world power. Traditionally, those with the best knowledge have had control over the rest of mankind. Now that information can be spread quickly and easily, traditional power monopolies will erode. Traditionally poor nations (those with unfavorable geography and geology) will have opportunities equal to the traditionally more favored nations, as the example of Japan implies. The information age may also lead to a redefinition of civilization as communities of peoples rather than of places. For higher education, this new age will necessitate a redefinition of scope from narrow, specialized education to education for breadth: the development of citizens with a global perspective. (LP)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED242641

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Harlan Cleveland

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

THE INTERNATIONAL INFORMATION REVOLUTION

An address by

Harlan Cleveland

Director, Hubert H. Humphrey Institute of Public Affairs

University of Minnesota

at the

Seminar on State, Nation and Religion

Faculty of Humanities

University of Haifa

March 15, 1984

SO 015 563

The International Information Revolution

Harlan Cleveland

You have invited me as part of symposium on "State, Nation and Religion," to open a discussion on "the international information revolution." I will of course not presume to suggest the implications for Israeli politics, Israel's foreign policy, or Zionism's future of the macrotransition we all are in. That will be for you to say, or think to yourselves. But I will undertake to describe the unprecedented characteristics of what I think is indeed the revolutionary time in which we are privileged to live.

I.

We are all living and working in an "information society" -- a society in rapid transition for many reasons, chief among them the explosive convergence of fast computers and modern telecommunications.

The countries with the biggest flows of information we call "developed." But anybody can extract knowledge from the bath of information which nearly drowns us all. You don't have to find it within your own frontiers, you don't have to grow it in your own soil. You don't have to fabricate it in factories or put it together in assembly plants. You just have to "get it all together" in your own brain -- and then combine your brain with others in organizations designed to make something different happen.

Communication satellites and fast computers are gradually erasing distance, eroding the idea that some places are world centers because they are near other places, and others areas are bound to be peripheral because they are remote from the center.

The passing of remoteness is one of the great unheralded "macro trends" of our extraordinary time. Once you can plug in through television to U.N.

votes or a bombing in Beirut or a Wimbledon final; once you can participate in rule, power and authority according to the relevance of your opinion rather then the mileage to the decision-making venue -- then the power centers are wherever the brightest people are using the latest information in the most creative ways.

In such a world you can still be remote if you want to, but you'll have to work at it. The explosive fusion of rapid microprocessing and global telecommunications presents Israelis -- and many many others -- with a choice (and an obligation to choose) between relevance and remoteness.

There will be costs and there will be benefits to either choice -- but the necessity to choose is new and inescapable.

When a much-read philosopher of business administration such as Peter Drucker starts calling knowledge "the central capital, the cost center, and the crucial resource of the economy," non-philosophers preoccupied with the managing of organizations have to sit up and take notice.

If we take seriously the notion that information (through being refined into knowledge and wisdom) is our "crucial resource," what does that portend for the future? Thinking about the inherent characteristics of information gives us clues to the vigorous rethinking that must now begin.

1. Information is expandable. Anne Wells Branscomb calls it a "synergistic resource ... the more we have the more we use and the more useful it becomes."

Some information for some purposes is certainly depletive over time. A tip on an afternoon horse race might be valuable at lunchtime and valueless at dinnertime. Yesterday's weather forecast is of merely historical interest tomorrow. But for the most part, as John and Magda McHale were already saying a decade ago, information expands as it is used. Whole industries have

grown up to exploit this characteristics of information: scientific research, technology transfer, the computer software industry (which already makes a much bigger contribution to our GNP than the manufacture of computer hardware), and agencies for publishing and advertising and public relations and government propaganda to spread the word (and thus enhance the word's value).

2. Information is transportable -- at the speed of light and perhaps, through telepathy, faster than that. In less than a century, we have been witness to a major dimensional change in both the speed and volume of human activity, a change in transportability of resources greater than the multimillenial shift from foot travel to supersonic jets.

3. Information is diffusive. It tends to leak -- and the more it leaks the more we have. Information is aggressive, even imperialistic in striving to break out of the unnatural bonds of secrecy in which thing-minded people try to imprison it. Like a virus (which is itself a tiny information system), information tries to affect the organisms around it -- whether by over-the-fence gossip or satellite broadcasting. "There are no secrets," a general told a Congressional hearing last year. The straitjackets of public secrecy, intellectual property rights and confidentiality of all kinds fit very loosely on this restless resource.

4. Information is shareable. Shortly before his death the great British communications theorist Colin Cherry wrote that information by nature cannot give rise to exchange transactions, only to sharing transactions. (The delivery system creates an exchange market. If I sell you a book I have written, you own the book, but there is no sense in which you "own" the ideas in the book.) Things are exchanged: if I give you a flower or sell you my automobile, you have it and I don't. But if I sell you an idea, we both have it. And if I give you a fact or tell you a story, it's like a good kiss: in

sharing the thrill, you enhance it. Conversely, if my kiss carries a disease (information harmful to your mental health) that sharing transaction may be infectious.

Unlike coal or uranium or steel or automobiles or food or clothing, then, information is expandable, highly transportable, diffusive and shareable.

In the United States, still the most "postindustrial" country, about half of all work, as defined by the Census Bureau's employment cateogories is now information work -- not only writing and calculating, but what executives, secretaries, programmers, consultants, and hundreds of other kinds of workers do. And, though the Census Bureau doesn't say so, the ratio of brainwork to drudgery in nearly every job keeps rising. What are the implications for our inherited social wisdom of this sudden dominance of the information resource?

Information now plays so prominent a role in postindustrial society that we are tempted to treat it as a new subject or field, or even a separate discipline. It's something like the early reaction to space exploration. When the Mercury and Apollo programs were projected, it seemed at first that outer space might become a new principle of organization. But it soon dawned on us that space was not a new subject but a new place where all the old subjects -- physics, biochemistry, medicine, military science, law, economics, politics, even art and philosophy -- took on interesting new dimensions.

In a similar way, the convergence of computers and telecommunications doesn't resolve the ancient puzzles about human rights and responsibilities, Man and Nature, liberty and authority, productivity and fairness, pursuit of the common good in a world full of individuals, and protection of the global commons in a world full of sovereign nation-states.

The new information environment, what the French call "l'informatisation de la société" (the informatization of society) does change the context in

which these durable dilemmas present themselves in the 1980s and 1990s. Out there in the market place of ideas, this expandable, transportable, leaky, shareable resource is creating a lot of confusion as it erodes our comfortable assumptions.

Some of the erosion is already too obvious to require extended remarks this afternoon:

In accounting, the concept of depreciation is bound to depreciate in value in dealing with a resource that may not be depletive, indeed may expand with use.

In economic theory, we are going to have to go beyond doctrines about the allocation of scarce resources to accomodate an econcmic reality in which the dominant resource is not scarce. Information sometimes seems, indeed, to be "in chronic surplus," as Lewis Brancomb, Chief Scientist of IBM, wrote in 1981.

These and many other challenges to inherited ways of thinking, challenges that result directly from the informatization of society, will have to be taken up by the specialists in their various disciplines and professions -- or risk the charge that the great academic disciplines and noble professions, the product of 300 years of logical positivism, are unable to explain the reality around us, let alone enable us to mould to it serve human needs and purposes.

But the informatization of society requires rethinking in even more fundamental ways, of concepts built so deep into our social and individual idea-systems that we have almost forgotten how to think about them. Consider with me, for a few moments, the implications of "l'informatisation" for our inherited, ingrained, internalized ways of thinking about the law of ownership; about management and organizations; about military strategy; about global equity or fairness; and about the communities we call State, Nation and Religion.

II.

I shall refer several times in these comments to Canute, a Viking king of England, so I should perhaps explain my metaphorical way of thinking. Some people collect coins or stamps or snuffboxes or forgeries of Salvador Dali paintings. I have taken to collecting Canutes -- instances of behavior reminiscent of the legendary Danish monarch who stood on a British beach and commanded the tides to stand still as proof of his power.*

The information environment created by the explosive convergence of computers and modern telecommunications is full of examples of Canutish behavior. The trouble seems to be that we have carried over into our thinking about information concepts which used to work pretty well for the management of material things. But information (enhanced by modern telecommunciations and fast computers) is such a different kind of resource that our inherited wisdom is somehow transmuted into folly.

Take the question of "information-as-property."

The openness which the informatization of society brings in its train is bound to raise fundamental questions about the idea that information "belongs" to a person or an organization. The propensity of information to leak is, like waves eating away the foundations of a seashore condominium, eroding the doctrine that information can be owned, exchanged and monopolized the way "real" resources can. Those who persist in treating information as property are likely to get wet.

---

* The King Canute legend is actually a bum rap. Magnus Magnuson's VIKINGS (E.P. Dutton, 1980) and other authorities make clear that Knut "intended the tide to give him a wetting, as an object lesson in humility for the benefit of the assembled courtiers," who thought him all-powerful. But his name has gone down in history as a metaphor for efforts to avoid the unavoidable tides of change, and it is in this sense that we evoke his memory here.

Two kinds of waves are rolling in. Dynamic high-technology keeps developing better and faster techniques of piracy -- xerography, videotape, the backyard dish for picking up signals from satellites. The knowledge explosion also produces new kinds of works, (computer software) and means of delivery (microfiche, video cassettes, computerized data bases). Laws written to protect books and phonograph records and broadcasts, the products of the past, are getting harder and harder to apply. Laws which address technologies not yet invented are hard to write.

Yet the Canutes persevere.

The Association of American Publishers sued New York University and nine professors for infringing copyright when they help students learn by copying useful literature. The publishers had to settle for vague promises to be good, at least for four years; they didn't even get their court costs back.

The Columbia Broadcasting System believed for a time that it could establish a proprietary right to what it reports on "CBS News:" it sued Vanderbilt University to restrain its librarians from lending out videotapes of its news coverage. "They think they can 'own' history," said one outraged scholar. A powerful senator from Tennessee soon got a law passed that made clear they couldn't.

When I bought a home computer, two years ago, the contradiction was right up front. On the cover page of my word-processing software, in language unmistakably written by lawyers, I was threated with mayhem if I copied the floppy disk designed to tell the computer it was a word-processor. On the first page of the software instructions, I was told as a matter of simple prudence to be sure to make two backup copies of that very disk. I took the software programmers' advice, and I have not yet been sent to prison.

My favorite case has just been settled by the U.S. Supreme Court.

Universal City Studios, which produces movies for television, was trying to get SONY to ban the sale of videocassette recorders for use by people in their living rooms. A panel of Federal appeal judges in the Ninth Circuit agreed with Universal, in an opinion which for sheer effrontery to common sense rated the King Canute prize for 1982:

"'Off-the-air' copying of copyrighted materials by owners of videotape recorders in their homes for private noncommercial use, constitutes an infringement of copyrighted audiovisual materials."

The Supreme Court, by the surprisingly narrow margin of 5 to 4, reversed the appeals court -- so the 10 million owners of VCRs can still rest easy on their living room sofas.

Sometimes the law seems to be like Kipling's Elephant's Child, its nose pulled out of shape by the crocodile of reality. I have strugged through the densely legalistic prose of Universal City v. SONY, and diagnosed the appeals judges' problem: a dynamic technological environment makes them acutely uncomfortable. In the tradition of the law, which looks backward at precedent and past legislative intentions, they hitched their wagon to what Congress in its ignorance meant to say about technologies it couldn't yet imagine.

Courts are inhibited (though not precluded) by training, tradition, mandate and structure from recognizing the nontraditional. The great dissenters such as Holmes and Brandeis were willing to peer into the future, but their dissents didn't become "the law" until, much later, the future arrived. Where there is no past to cling to, some judges become disoriented -- and the resulting obscurity of their language doesn't really hide the fact that they are at sea.

Facing a resource which cannot be exclusively owned or exchanged, but must be shared, the jurisprudes have some heavy thinking to do.

In international politics the doctrines that assume the sovereign

ownership of information are in maximum disarray. Every newly miniaturized recording or micrographic device, and every new satellite launched for communication or photography or remote sensing, makes it more difficult to sustain the doctrine that national governments can own, or even control, their information resources.

In 1979 the U.S. Government sent two delegations to two world meetings about the control of information. At a UNESCO conference in Paris, the instructed delegates righteously advocated the "free flow" of information -- information furnished by U.S. news agencies, U.S. television producers, and U.S. movie studios. At the U.N. Conference on Science and Technology for Development in Vienna a few weeks later, an equally righteous group of instructed Americans came out against the free flow of information -- information as technology we were anxious to hoard.

Both principles are authentically American: the right to choose, the right to own. In world politics we are not going to be able to have it both ways, but the government hasn't yet gotten the word. Not long ago the U.S. State Department earned the King Canute Prize for 1983 by writing letters to European owners of IBM computer equipment, asking that they not move such equipment from, say, Birmingham to Manchester without first asking U.S. permission. This assertion of extraterritoriality, over equipment produced by a multinational company with headquarters in the United States, was designed to prevent "strategic" equipment from flowing indirectly to Communist countries. Regardless of the merits of the case, the edict is unenforceable. In the global information society, the long arms of "ownership," and "control," are foreshortened.

III.

Knowledge is power, as Francis Bacon wrote in 1597. So the wider the

spread of knowledge, the wider will be spread administrative authority, the flatter will be the pyramids of organizational power, and the more work will have to get done by horizontal process -- what the Japanese call consensus, the Indonesians call mushyawara, the Communists call collective leadership and we call committee work or teamwork. If the Census Bureau counted each year the number of committees per thousand population, we would have a rough measure of the bundle of changes that persuade us to call America an "information society."

The King Canute prize for 1981 was easily won by Secretary of State Alexander Haig. Shortly after the attempted assassination of President Reagan, Haig announced on television from the White House that "I am in control here." That produced neither reassurance nor anger from the American people, but nervous laughter, as in watching a theatre of the absurd. We the people know by instinct that in our pluralistic democracy no one is, can be, or even should be "in control," that by Constitutional design reinforced by information technology we live in a nobody-in-charge society.

We all know other Canutes whose absurdities don't get on national television: executives who give orders when they should be asking questions, managers who think of their co-workers as superiors or subordinates, impatient doers who don't have time for lateral consultation -- in sum, the builders of bureaucratic pyramids who haven't yet adjusted to the new information environment.

In an information-rich polity, the very definition of "control" changes. Very large numbers of people empowered by knowledge -- coming together in parties, unions, factions, lobbies, interest-groups, neighborhoods, families, and hundreds of other structures -- assert the right or feel the obligation to "make policy."

Decision-making proceeds not by "recommendations up, orders down" but by plural improvisation on a shared sense of direction.

Not "command and control," but consultation and "networking" is the mandatory mode for getting things done.

Secrecy goes out of fashion, because secrets are so hard to keep.

Participation and public feedback become conditions precedent to decisions that stick.

And "policy" widens out to become what Paul Appleby called it a generation ago: "the decisions that are made at your level and higher."

On an earlier visit to Israel I was told how an Israeli battalion commander performed a drill in honor of a visiting dignitary. In a quiet, conversational voice, the commander gave the order: "Battalion march." The visitor, a senior general, was surprised, and leaned over to give the young leader a word of advice. "You have to shout the order, so they all start together." The young commander smiled tolerantly at this relic of the era of vertical administration. "Don't worry, General," he said. "The word will get around."

"The word will get around." That phrase expresses as well as any the essential nature of the information society.

IV.

The disarray of traditional military strategy is also embarrassingly evident.

The rivalry that piles up more and more nuclear weapons, with more and more throw weight, has paradoxically made the arms race more and more of an information game. Beyond a certain point -- the point at which each side can obliterate the other on command -- not the weight of weapons but the quality of intelligence is the priceless ingredient of defense. Not estimates of

capabilities but judgments about intentions become crucial. And in the intelligence business, by a paradoxical twist of fate, it isn't the maintenance of secrecy but the management of openness that counts most in playing the deadly information game.

If information is inherently hard to bottle up, policies based on a long-term information monopoly are likely to have a short half-life. For the 1980s and beyond, the principle of action is clear: if the validity of your action depends on its continuing secrecy, watch out!

In our generation-long arms race with the Soviet Union, successive U.S. administrations have managed to persuade themselves that each new U.S. weapons system -- its made-in-America technology a continuing mystery to our adversaries -- would enable us to stay "ahead." In the most Canutish of these actions, the United States in the early 1970s decided to stuff multiple independently targetable re-entry vehicles (MIRVs) into single missiles. Despite elaborate secrecy on our part, the Soviets very soon figured out how to do likewise. But since they (for other reasons) had built much larger missiles boosted by more powerful rockets, they were able to stuff more MIRVs into their canisters than we could. Thus did we outsmart ourselves by taking an action which depended for its validity on technological secrecy, and created the famous "window of vulnerability" instead.

A prime example of Canutish behavior in my personal experience was U.S. reluctance to tell our NATO allies what we knew from satellite reconnaissance about Soviet deployments of missiles aimed at European targets -- when they were bound to learn about them sooner or later. A wave of common sense inundated that policy when in 1966 Robert McNamara as Secretary of Defense handed to allied defense ministers, in the top-secret precincts of the Joint Chiefs' War Room, the satellite photos we had been withholding until then. That was 17 years ago, but I can still vividly recall the shocked expressions

on the faces of the security men lining the walls as McNamara dove into his briefcase and tossed onto the table for international inspection the prize examples of our space-based photography. After that it became routine to share with our NATO allies what our declared adversaries already knew.

In the management of mutual deterrence the overclassification of information about what we could do if we had to, may actually increase the danger of war by miscalculation. The core of the nuclear deterrent, that remarkably stable if unattractive substitute for peace, is the Soviet leaders' uncertainty about what the U.S. President would do in the event of Soviet moves against our allies or ourselves, combined with the Soviet leaders' certainty that we have the means to retaliate no matter what. Keeping our intentions credibly uncertain is easy: we cannot know what we would do if, until we know what the if is. But keeping from our adversaries full knowledge of our capabilities merely adds an extra element of madness to the "bad momentum" of the nuclear arms race. And if the means of intelligence are increasingly vulnerable, as complex command and control based on clearly visible satellites are bound to be, the madness is compounded once again.

Our own government has for three decades engaged in half-hearted and demonstrably inefficient efforts to bottle up "strategic" U.S. science and keep foreign nationals out of "sensitive" university research. In our mostly open society, it never has worked very well. Americans have no corner on the market for brains; scientists talk across frontiers to each other; our European and Japanese allies never had much enthusiasm for controlling transborder information flows (sales of equipment mean jobs) and Soviet technological espionage has long been a thriving industry.

Keeping our R & D to ourselves is a policy that depends for its validity on secrecy; as the informatization of society intensifies in the postindustrial

world, it can be expected to work less and less well.

Similar government behavior used to work better for dictators and totalitarian bureaucracies in societies where keeping information from spreading is honored by doctrine and practised ad absurdum. Xerox machines are still licensed by the government in the Soviet Union; in Bulgaria, even typewriters are closely controlled. But ideas are harder to license; Russian youngsters readily learn about blue jeans and hard rock, and scientists on both sides of the porous Curtain seem to know how far along their peers are in unraveling (for example) the puzzlements of rocketry and space travel.

The good news is that information is leaky, that sharing is the natural mode of scientific discovery and technological innovation. The new information environment seems bound to undermine the knowledge monopolies which totalitarian governments convert into monopolies of power. In the horoscope of the USSR and the "Soviet bloc," a future looms where nobody is in charge.

V.

What are the implications of the "information revolution" for fairness, equity, access to the power that is knowledge?

This expandable, transportable, diffusive, shareable resource -- in a single adjective, this accessible resource we call information -- has many of the characteristics of a commons. In old England, the commons, as Ivan Illich defines it, was "that part of the environment which lay beyond their own thresholds and outside of their own possessions, to which, however, they had recognized claims of usage, [not to produce commodities but to provide for the subsistence of their households]." The commons "was necessary for the community's survival, necessary for different groups in different ways, but ..., in a strictly economic sense, was not perceived as scarce."

Pastures for sheep and cattle were commons. So today, despite the enclosure of

the older commons, there are some important global environments: the deep ocean and its seabed (the Law of the Sea Treaty encloses some of the deep ocean but not all of it), the weather (which belongs to nobody and therefore to everybody), outer space, celestial bodies and the continent of Antarctica -- the last three by treaties. The question for consideration is whether most information is inherently -- not by formal agreement but <u>because of its nature</u> -- a commons too.

Illich, in a brilliant speech in Tokyo in 1982, argued that electronic devices (from the microphone to the computer) are a form of "enclosure," reserving to a few the privilege of breaking the silence otherwise available to the many. But the forced march of technology, personal computers combined with global telecommunications, may require even that prescient philosopher to revise his judgment. My hunch is that the explosive fusion of computers and telecommunications can empower the many to "make policy" in arenas where only the few, with their superior information resources, used be "in charge."

Information was always the basis of human organization, of course. Those with better or more recent information (Moses with his tablets, generals with their fast couriers, kings with their spies and ambassadors, speculators with their quick access to markets for gold, diamonds or stock certificates, security forces with their sources of rumor and gossip) held sway over the rest of mankind. But once information can be spread fast and wide -- rapidly collected and analyzed, instantly communicated, readily understood by millions -- the power monopolies that closely-held information made possible are subject to accelerating erosion, though both the monopolies and their victims have been slow to perceive it.

There is evidence for this outrageously hopeful proposition in our three and a half decades of experience with "development" in Asia, Africa and Latin America. The informatization of society may destabilize more than the Soviet bloc. It may strike a blow for global fairness -- by helping to undermine the

systems that still keep two billion people in relative poverty, and more than a third of them in absolute poverty.

In the industrial era, poverty was marked by an absence of things -- minerals, foods and fibres, manufactures. In the post-industrial era, these physical resources are joined at center stage by information, the resource that is harder for the rich and powerful to hoard. But whether the informatization of the globe will make for a fairer distribution of its resources depends on the extent to which people in the traditionally "poor nations" are motivated (and allowed by their own suzerains) to educate themselves for full participation in the information-rich environment.

The key that unlocks "growth with fairness" in this changing context is thus the widespread delivery of relevant education.

More than any other one factor, it was that prescient 19th century decision to offer free public education to every citizen that enabled the United States to pull itself out of underdevelopment. It was another wise educational policy, the Morrill Act of 1862, using Federal land grants to set up university-based agricultural research stations and build a county-by-county Extension Service to deliver the resulting science directly to the farm, that created the productivity miracle which is American agriculture.

Today, around the horizon of the developing world, in Asia, Africa and Latin America, the close connection between education and "growth with fairness" is now crystal clear.

The growing importance of information in creating wealth has to be good news for countries less favored by geology and arable land than the early arrivers in the industrial age. The poor can get rich by brainwork -- the Japanese have amply illustrated the wealth-creating theorem, and the hustling, educated peoples of South Korea, Taiwan, Singapore and Israel have more

recently provided a similar demonstration. They have not only grown faster than other developing countries, but they have spread the benefits of that growth more fairly among their people than most countries that are favored (as they are not) by oil or hard minerals or soil or climate.

Around the developing world, indeed, the striking paradox is that most successful countries are precisely those not blessed with rich natural resources.

A country such as Japan, with virtually no fuels or minerals, with a short growing season and much farmland we would call marginal, was forced by physical poverty to bet on the only sure resource it had, the brains of its people -- by getting them all, not just an elite few, educated. That turned out to be the most profitable investment of all. Once trained, the educated brains seem able to pull in from the global information flow the data, knowledge and insights needed to create a development strategy of their own.

Even if the richer countries are not very good at helping the poorer ones -- even if we ourselves act in Canutish ways (limiting access to our markets, trying to hoard our technologies, starving our educational exchange programs) -- the developing countries that bet on universal education for their own people, and thus learn how to seek facts and ideas about technology, management, markets and governance, can readily secure these hardest-to-hoard of resources.

By contrast, in the countries whose people have been kept in ignorance (by colonial policies, or their own leaders' mismanagement, or first one and then the other), it doesn't seem to matter what riches lie in the ground they occupy. Most of their citizens become the peasants of the global information society -- along with the dropouts of the postindustrial world. The physical riches are siphoned off to the educated minority huddling in the affluent sections of their central cities -- and to the information-wise foreigners who

come in to do good and do well.

The excuse for poverty in the industrial era was that resources weren't enough to go around. If the rich and powerful believe that it's only at their expense that resources can be shared with the less fortunate, they will cast themselves as the Canutes of world politics: that is, they will dig in and resist spreading information around through education. But if information, the increasingly dominant resource, is really expandable, transportable, diffusive and shareable, there will be less excuse in the future than in the past for depriving whole populations of the benefits of positive-sum development.

The modern King Canutes will be wise to assume that the information tide is coming in, and adapt their behavior accordingly. Knowledge is power, and let's not forget it.

VI.

I have argued the mind-blowing implications of l'informatisation de la société -- the informatization of society -- for our own inherited concepts of ownership, management, strategy, and fairness. Let's look at just one more inherited notion: that the most important communities, the politically relevant communities, are based on geography -- neighborhoods, provinces, nations, continents.

Let me suggest, without scholarly reservations, an alternative proposition suggested by Magda McHale: that in the new information environment, civilization will be built more around communities of people, and less around communities of places.

That this trend is already well advanced can be seen in a quick review of what is meant today by the three words in the title of this Conference. The "State" is not withering away, as with their different motives Karl Marx

and the advocates of world government would have desired. But power is leaking out of sovereign national governments in three directions at once.

The "State" is leaking at the top, as more global functions require the pooling of sovereignty in a World Weather Watch, in geophysical and meteorological research, in eradicating contagious disease, in satellite communication, in facing up to global environmental risks.

The "State" is leaking sideways, as multinational corporations -- "private," pseudoprivate, and "public," -- conduct more and more of the world's commerce, and operate across political frontiers so much better than committees of "sovereign" governments seem able to do. (One-quarter of what I learned in school to call "international trade" is now the internal transactions of transnational companies -- including those of Elscint, Ltd., whose chairman, Avraham Suhami, will shortly succeed me at this podium.)

The "State" is also leaking from the bottom, as provinces, minorities, communities and neighborhoods take control of their own destinies, legislating their own growth policies, their own population policies, their own environmental policies.

And what does "Nation" mean in this context? Increasingly it means ethnicity -- the Frenchness of Quebec, the tribal loyalties of the Ibo in Biafra, the separatism of the Scots, the rhetorical nationhood of the Arabs, the world's many diasporas ranging from the Overseas Chinese to the Zionist -- and non-Zionist -- Jews.

In the information game of global ethnicity, Israel is certainly one of the "advanced" countries; the Jewish people have been at it for so long. The potential of real-time networking is now a powerful new means of communication with the electronic diaspora -- if Israel has ideas to sell to, or wants to solicit ideas from, the information-rich global community which is world

Jewry.

And "Religion?" In a world of people-communities, not place-communities, the "parish" cannot be mostly geography-based. Even "established" religions are likely to break free from their national and regional parishes. The Roman Catholic Pope's extensive travels and the terrorist outreach of the Ayatollah Khomeini's Shiites form a grotesque correlation: both are breaking loose from historic geographic boundaries to appeal to a wider religious -- which is to say political -- constituency.

Communities of people, not of places: I leave to my Israeli friends the drawing of conclusions from this "megatrend" for Israeli policy in the '80s and '90s and beyond.

VII.

What is the lesson from all this for higher education? To select two institutions at random, what does all this mean for the University of Haifa and the University of Minnesota?

Let me answer my own question with another metaphor.

Isaac Stern, the Jewish violinist and philosopher of music education, was once asked how it happened that all professional musicians could play the right notes in the right order, but some made beautiful music and some did not. "The important thing is not the notes," he replied. "It's the intervals between the notes."

That is not only a wise comment about music, it's a piece of fundamental wisdom about higher education. The important thing about any process is not its isolated components; what makes them dynamic is the connections between and among them. What ought to be "higher" about higher education is not only the most disciplined specializations but their interdependence. Our colleges and universities should be centers for the broadest and most integrative

thought.

I hasten to assure you that I think experts are indispensable. Some of my best friends are experts -- and the teachers who make them possible. Expertise is not an endangered species; its remuneration, renown and rewards easily survive integration with other specialized knowledge in government agencies, corporations, and other inclusive systems. But the limiting factor in the kind of civilization we call modern industrial democracy is no longer our capacity to delve ever deeper into the remotest corners of reality for original contributions to human knowledge. We have gotten very good indeed at doing that.

The factor that now limits our civilizing energies is our capacity to get it all together ... to relate the parts to the whole ... to see the interconnections among the disparate "facts" ... to play the intervals as well as the notes.

In my judgment we cannot keep defining as the highest education the narrowest training for specialization. What's missing -- at least in the United States -- is something very different from expertness. It's integrative brainwork -- the capacity to synthesize for the solution of real-world problems the analytical methods and insights of academic disciplines and specialized expertise. The art and science of "getting it all together," which is to say reflective leadership and enlightened followership, is what should be "higher" about "higher education."

For three centuries we have bet on a system that defines higher education as deeper, narrower, more specialized education. Yet it is becoming uncomfortably obvious that what ought now to be "higher" about higher education is education for breadth.

Breadth is a quality of mind, the capacity to relate "the facts" to a coherent theory, to fashion tactics that are part of a strategy, to act today

in ways that are consistent with a studied view of the future.

Breadth is not a contradiction of depth, but its complement. No one person can know enough to put a man on the moon, in the sense that grandpa could know just about everything about managing his corner grocery store. So different kinds of people, with differing knowledge and skills and networks of friends and acquaintances, have to come together in organizations designed to transmute their separate expertnesses and their collective insights into wise decisions about real-world problems -- which are all interdisciplinary, interdepartmental, interprofessional and (increasingly) international. And the priceless ingredient is this: each of the participants in this complex choreography has to have some understanding of the whole scene in order to play a relevant bit part in the big complexity.

We start with a heavy bias against breadth. It's an open secret that the modern university is not well suited for the task of educating people to "get it all together." The university's self-image, its organization and its reward systems all tilt against breadth.

The university as we know it developed as an expression of the scientific method, which progressed so well by dividing into separate compartments the different kinds of knowledge, and into separate disciplines the proven methods of inquiry. We still need the experts this kind of higher education is good at producing. We will need lots more of them.

But in my judgment we have an even greater need for what the modern university, by and large, is not producing -- tha analysts who can relate "hard" technologies to their "soft" impacts and implications; the reflective practitioners who are concerned with human values; the educators who can teach in global perspective; the managers who can bring their more specialized brothers and sisters into organizations to make something different happen;

the legislators who can relate all the policies they make to each other; in a word, the citizens and leaders who can think about the whole canvas while painting their one corner of it.

That, surely, is the highest mandate for "higher education," whether in Israel or in Minnesota. In each society the depth of development will depend on the breadth of the leaders it can produce. And when it comes to leadership, the first stage of the production line is its educational system.

Note

This lecture draws from, but goes beyond, earlier writings on "the informatization of society" viz:

"Information as a Resource," The Futurist, December 1982

"King Canute and the Information Resource," Intermedia, January 1984 (shorter version in Technology Review, January 1984)

HARLAN CLEVELAND, a political scientist and public executive, is Professor of Public Affairs and Director of the Hubert H. Humphrey Institute of Public Affairs, University of Minnesota. In earlier lives he has been a civil servant, economic welfare specialist, foreign aid administrator, magazine editor and publisher, academic dean, Assistant Secretary of State, U.S. Ambassador to NATO, President of the University of Hawaii, and director of the Aspen Institute's Program in International Affairs. His many writings include The Overseas Americans (1960), The Obligations of Power (1966), NATO: The Transatlantic Bargain (1970), The Future Executive (1972), China Diary (1976), The Third Try at World Order (1977) and Humangrowth: An Essay on Growth, Values and the Quality of Life (1978).